

US EPA ARCHIVE DOCUMENT



Does agriculture affect avian migration and distribution?

Environmental Issue

Migratory patterns of many avian species have changed

Migratory routes and distances have been altered¹
Proportions of migrants within populations have decreased²

Land conversion to agriculture may be causing migrant birds to become resident

Agriculture can alter levels of critical resources³
High year-round prey levels may cause birds to stop migrating



Burrowing owls are a model organism for studying effects of agriculture on migration
Proportion of migrants varies among populations
While northern populations have declined, populations in the agricultural environments are increasing
Year-round prey availability in agricultural areas may be causing migratory individuals to become resident⁴

Scientific Approach

Hypothesis: Changes in food abundance associated with increased agriculture have caused burrowing owls to stop migrating.

Research Plan:

- * Use stable isotope ratios in feathers and resighting of color bands to determine which individuals overwinter and which migrate
- * Determine where migratory owls overwinter based on isotopic signatures
- * Experimentally augment prey levels at a subset of burrows to simulate effect of elevated prey on overwintering
- * Determine whether local food abundance influences the probability of overwintering through prey sampling at nest burrows



Conversion of western drylands to agriculture may be causing burrowing owls (*Athene cunicularia hypugaea*) to stop migrating.

Impact

Burrowing owl conservation

- Endangered in Canada and a species of concern in the U.S.
- Results may help explain changes in range and abundance
- Addresses possible effects of future land use decisions for persistence of burrowing owl populations

Migratory birds and global change

- Need for experimental tests of the causes of altered avian migration
- Changes in migratory behavior could affect distribution of migratory birds on a large scale
- Results may help assess the potential effects of agriculture and climate change on other species of migratory birds

REFERENCES: 1. Berthold and Pulido 1994, Fiedler 2001; 2. Berthold 2001; 3. Fiedler 2001; 4. Conway, personal communication
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